ME 4900: Powertrain PREP II
Course Policies and Syllabus

Instructor of Record: B. P. Sangeorzan, Ph.D.
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Office Hours: By arrangement.

Class Times: F, 2:45 – 4:45 pm, 275 EC

Course Web Site: https://moodle.oakland.edu/moodle/login/index.php

Teaching Assistant: Tim Ross, tgross@oakland.edu
  Office hours: tbd

Text: Course notes (Powerpoint) will be provided

Course Overview: This is a senior-level engineering course, the second semester in the *Powertrain PREP* program, which is designed to further your understanding of automotive driveline, transmissions, engines and combustion and emissions.

Course Prerequisites: This course requires, as a prerequisite, the first semester of *Powertrain PREP* or equivalent experience.

Course Objectives: By the end of the course, students should be able to explain the functionality of driveline components and transmissions, explain the basic principles of vehicle electrification and powertrain controls. Specifically, the successful student should be able to:

- Explain the primary functions of light-duty internal combustion engine components such as cylinder heads, block and valvetrain. (i, j)

- Describe the operation of transmission components, including clutches and planetary gears and carriers and be able to apply the lever diagram to explain transmission shift and torque ratios. (i, j)

- List some of the factors and mechanisms that control engine air flow and describe how they affect the air flow. (i, j)

- List some of the emission sensors commonly used on modern gasoline engines, and explain their functionality. (h, i, j, k)

- Describe the common functions of the OBD system. (h, i, j, k)

Course Grade :   Weekly Homework Quizzes   50 %
                         Design/Analysis Project   50 %

Approximate Course Calendar:

Week #	Date	Topic	Location
Week 1	(1/4)	Light-Duty Vehicle ICE	EC 275
Week 2	(1/11)	Driveline 101	EC 275
Week 3	(1/18)	Controls, Software, Power Electronics	EC 275
Week 4	(1/25)	Project Introduction	EC 275
Week 5	(2/1)	Transmissions 201	EC 275
Week 6	(2/8)	Air Flow and Combustion	EC 275
Week 7	(2/15)	Lubrication Systems / Accessory Drive	EC 275
Week 8	(2/22)	Thermal Management	EC 275
Week 9	(3/1)	Cranktrain/ Valvetrain/ Block/ Heads	EC 275
Week 10	(3/8)	Emissions Sensors / Ignition Systems	EC 275
Week 11	(3/15)	Emissions/ Aftertreatment/ WWOBD	EC 275
Week 12	(3/22)		
Week 13	(3/29)	Interviewing 101	EC 275
Week 14	(4/5)	Final Presentations	FCA Headquarters (CTC)

Important Dates: (https://www.oakland.edu/registrar/important-dates/)
- ✓ Tuesday, September 18th - Last Day 100% Tuition Refund
- ✓ Tuesday, September 18th - Last day for "no-grade" drop
- ✓ Saturday, September 29th - Last day to file application for degree for Fall 2018
- ✓ Wednesday, November 7th - Last day for official withdrawal (W)
- ✓ Friday, December 7th - Last PREP class meeting – Final Presentations
- ✓ Saturday, December 9th, Fall classes end at 10 pm.
- ✓ Friday, December 8th - Presentations – 12:30 – 2:30 pm

Some Course Policies

Homework & Quizzes: This course is based upon the in-class presentations and hand-out slides, and therefore no traditional homework will be assigned. However, following each weekly presentation, there will be an online quiz through Moodle. Online quizzes will be open-book, but must be completed **without any assistance or collaboration.** No credit or make-up will be given for a quiz that is missed without *prior* instructor approval or a certified medical excuse.

Group Project: This course will include a group project that is disseminated in approximately the third week of class. Groups will be formed by the instructor, and final project presentations will take place on the last day of class.

Academic Conduct: All students are expected to read, understand, and comply with the *Academic Conduct Policy* found in the *Oakland University Undergraduate Catalog*. (*http://catalog.oakland.edu/content.php?catoid=17&navoid=1145*) and the *Code of Student Conduct* (http://www.oakland.edu/studentcodeofconduct). The policy applies to testing, homework and laboratory work, and is taken very seriously by the instructor. Perceived violations of this policy will be taken before the OU Academic Conduct Committee. Engineering is a profession that serves the public and demands integrity within its membership.

Course Web Site: The *Moodle* (https://moodle.oakland.edu/moodle/login/index.php) course manager will be used to disseminate course policies, schedules, course and lab handouts, homework assignments and solutions, last-minute changes, and other course-related information. Students should check this site regularly. Lab handouts and homework assignments will *not* be distributed in class. Any emails from the instructor will be sent to your official OU email address only.

Please note that the use of cell phones, text messaging, tablets and laptops is not allowed in this class unless you receive special permission from the instructor.

Program Outcomes: ABET (a-k)
(a)   an ability to apply knowledge of mathematics, science, and engineering
(b)   an ability to design and conduct experiments, as well as to analyze and interpret data
(c)   an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environ., social,
political, ethical, health, safety, manufactured ability, sustainability
(d)   an ability to function on multi-disciplinary teams
(e)   an ability to identify, formulate, and solve engineering problems
(f)   an understanding of professional and ethical responsibility
(g)   an ability to communicate effectively
(h)   the broad education necessary to understand the impact of engineering solutions in a global economical, environmental, and societal context
(i)   a recognition of the need for, and an ability to engage in life-long learning
(j)   a knowledge of contemporary issues
(k)   an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice